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We thus have the paradoxical result that the rotation period is more than five minutes less at the equator than in the latitude of the red spot. The effect of the motion of matter from one part of the planet to the other would be to make the actual time of rotation longer as we approach the equator. The opposite effect noticed in the times of rotation of spots suggests the possibility that the latter may be endowed with a motion of their own; partaking, perhaps, of the nature of cyclones on the earth's surface.

RED SKIES A CENTURY AGO.

I VENTURE to suggest that recent phenomena are a re-appearance of those of 1783. It will therefore be interesting to give a sketch of the phenomena of 1783, in order to ascertain their similarities and differences.

In the spring of 1783 one of the greatest eruptions of Shaptar Jokul in Iceland resulted in the largest lava-streams ever observed, ten miles long, five miles wide, and a hundred feet deep. Obviously, great quantities of ash must also have been thrown up.

Towards the end of May, *höhenrauch* (dust-haze) was remarked first on the western coast of Europe. It was so thick as to render the sun invisible on the horizon, and even at mid-day it was only a red indistinct disk. It was first noticed, May 29, at Copenhagen, then in England, on July 6 and 7 in France, and rapidly spread over Europe, northern Africa, and eastern Asia. Neither rain, heat, nor cold dispelled it; and, having reached a maximum at the end of July, it remained visible till Sept. 26, 1783, at Copenhagen, thus lasting four months.

There are numerous instances of volcanic ash being carried very great distances. The dust from Coseguina in Central America was carried a hundred and seventy miles, towards Jamaica, and was so dense there as to darken the sky. Hence meteorologists concluded that the *höhenrauch* of 1783 was due to dust from Shaptar Jokul.

The similarity of the 1783 phenomenon with the present seems to me extraordinary. The frightful volcanic explosion of Krakatoa in the Sunda Straits, which began on Aug. 26, 1883, supplies, as did Shaptar Jokul, the material. The splendid redness at sunrise and sunset was first reported from India; and it will be an interesting inquiry to study the spreading of the phenomenon, as was done in 1783.

It was first seen in Japan at the end of August, but only reached Germany in November; and, from the dates of the various records, it seems evident that the ash was thrown into the upper regions of the atmosphere in the tropics. The extraordinary duration corresponds with that of 1783, and is to be explained by the fineness of the dust.

The differences are, that in our country the obscuration of the sun is less than in 1783, which would accord with the greater proximity of Iceland than Java.

It seems probable that rain and snow may bring some of the dust to the earth. I have therefore ex-

amined the residue of the rain-gauges from the 1st of December, but thus far without any positive results. Hence I infer that the dust is at present too high for it to be brought down: it is therefore most necessary that such observations be made in many places.

These views have been advocated by Lockyer, who, through spectroscopic research, has been led to the same conclusion.

Before, however, a final decision upon one or another hypothesis can be given, it will be necessary to collect observations, researches, and investigations, from as many points of the earth's surface as possible, which will doubtless be done in meteorological journals.

G. KARSTEN.

Kiel.

BROWNE AND BEHNKE'S VOICE, SONG AND SPEECH.

A practical guide for singers and speakers; from the combined view of vocal surgeon and voice-trainer. By Dr. LENNOX BROWNE and EMIL BEHNKE. New York, G. P. Putnam's Sons, 1884. 322 p., illustr. 8°.

A CAREFUL perusal of this work must establish the conviction in the mind of the reader, that the authors thoroughly understand their subject. In reference to voice-formation, many hitherto obscure points are made clear, and many hitherto doubtful points are settled, on physiological, and therefore indisputable, grounds. Thus, the distinctions between the various 'registers' of voice are proved to be due to demonstrable differences in the adjustments of the 'voice-box' and the vocal ligaments. A great deal of information is communicated on the subject of voice-cultivation, and the prevention and treatment of the ailments of 'voice-users.' The precepts in regard to hygienic habits for singers and speakers, their diet, and their clothing, so as to secure unrestricted freedom for the chest and the abdomen, are both judicious and important. About one-half of the book is taken up with the single subject of respiration. The proper management of the breath is shown to be a matter of the highest possible value to singers and speakers. The conclusions arrived at, in reference to the healthful and efficient use of the lungs, commend themselves as thoroughly sound and practical; but condensation in the treatment of the subject would have been a great improvement, as the same principles are again and again repeated under different heads.

The use of the laryngoscope is recommended more than will be thought generally advisable, so far as practical results are concerned; but the authors have handled this instrument to